

REMARKS/ARGUMENTS

Claims 1-19 are now pending, with claims 1 and 10 being independent. Independent claims 1 and 10 have been amended. Claims 18 and 19 have been added. Reconsideration of the application, as amended, is respectfully requested.

This Amendment, which is being filed concurrently with a Request for Continued Examination (RCE), follows a Request for Reconsideration filed November 4, 2009 and is in response to the final Office Action dated September 4, 2009. This Amendment also takes into account the Examiner's comments in the Advisory Action dated December 9, 2009.

Obviousness Rejection Over Fukamura In View Of Fusaroli

Claims 1 and 10 stand rejected under 35 USC §103(a) as obvious over U.S. Patent No. 6,121,675 ("Fukamura") in view of U.S. Patent No. 4,971,930 ("Fusaroli"). This rejection is respectfully traversed.

Amended claim 1 recites, *inter alia*, "wherein the optical device and the semiconductor component are fixed relative to one another and pressed against one another, thereby squeezing the at least partly cured connecting layer arranged therebetween," and "wherein the squeezed connecting layer generates an opposing force that strives to press the optical device and the radiation coupling area of the semiconductor component apart."

Fukamura discloses, in connection with Figure 10(b) and column 1, line 46 to column 2, line 3, a CCD image sensor having a plastic substrate 63 onto which a semiconductor optical sensor chip 58 is bonded. Metal wiring patterns 65 on the side of the sensor chip 58 are bonded to bonding pads of the sensor chip 58 via bonding wires. An insulating outer frame 64 is adhered to the plastic substrate 63 and the space surrounded by the insulating outer frame 64 is filled with transparent

resin 69 such that the transparent resin 69 completely seals the sensor chip 58 and the bonding wires 56. A transparent plate 57 is fixed to the outer portion of frame 64 with transparent resin or adhesive 70.

The space surrounded by the insulating outer frame 64 is described in Fukamura as being filled with transparent resin 69, as opposed to the resin being squeezed between components. Moreover, nothing in Fukamura describes or suggests that the resin generates an opposing force striving to separate the components. Thus, as acknowledged in the Office Action, Fukamura does not describe or suggest the configuration of optical device, semiconductor component, and connecting layer recited in claim 1.

The Office Action turns to Fusaroli for the features of claim 1 missing from Fukamura. Fusaroli discloses in connection with Figures 9 to 11 and column 2, lines 26 to 43 a process wherein a container of opaque plastic material 41 is provided in the form of a hollow body carrying a semiconductor chip 44 in a central window 42. In a further process step, a mass of uncured transparent resin 46 is poured over the semiconductor chip 44. In a further process step, a lens 48 is installed over the uncured resin:

In the window 42, utilizing the striking engagement with a shoulder 47, there is inserted a transparent lens 48 which compresses the mass of transparent resin 46, fixing the thickness thereof and distributing it uniformly in such a manner as to occupy all the interior space of the container 41.

(Fusaroli at col. 2, lines 34-39). This last step is illustrated by Figures 10 and 11. Figure 10 shows a mound of resin before the lens is inserted, and Figure 11 shows that as the lens is inserted into its fixed location, the uncured resin is redistributed "to occupy all the interior space."

As discussed in the Request for Reconsideration filed November 4, 2009, nothing in this description, or elsewhere in Fusaroli, describes or suggests that the resin is squeezed once the components are fixed relative to one another. Nor is there any description or suggestion that the resin generates an opposing force once the components are fixed relative to one another.

In addition, it is clear that Fusaroli does not describe or suggest squeezing an at least partly cured layer as recited in amended claim 1. To the contrary, Fusaroli **teaches away** from using a cured resin, because the resin disclosed in Fusaroli must allow for “distributing it uniformly in such a manner as to occupy all the interior space of the container.”

Thus, Fusaroli does not remedy the deficiencies of Fukamura discussed above. Therefore, the combination of Fukamura and Fusaroli does not describe or suggest: “wherein the optical device and the semiconductor component are fixed relative to one another and pressed against one another, thereby squeezing the at least partly cured connecting layer arranged therebetween,” and “wherein the squeezed connecting layer generates an opposing force that strives to press the optical device and the radiation coupling area of the semiconductor component apart,” as recited in claim 1.

In the Advisory Action, the Examiner takes the position that claim 1 does not require the connecting layer to actually be squeezed and, further, that claim 1 does not require the connecting layer to be formed before the optical device and the semiconductor component are fixed relative to one another. While Applicant does not agree with the Examiner’s interpretation of the claim language, the claims have, nevertheless, been amended herein to address the issues raised by the Examiner. Specifically, amended claim 1 recites: “wherein the optical device and the semiconductor component are fixed relative to one another and pressed against one another, thereby squeezing the at least partly cured connecting layer,” instead of “to squeeze the

connecting layer.” Claim 1 further recites: “wherein the squeezed connecting layer generates an opposing force,” instead of “the connecting layer, when squeezed, is configured to generate an opposing force.”

Accordingly, claim 1 is submitted to be patentable over the combination of Fukamura and Fusaroli.

Obviousness Rejections Over Bauer In View Of Spaeth And Other References

Claims 1-4, 7-13, 16 and 17 stand rejected under 35 USC §103(a) as obvious over U.S. Patent No. 6,130,448 (“Bauer”) in view of U.S. Patent No. 5,981,945 (“Spaeth”). Claim 6 stands rejected as obvious over Bauer in view of Spaeth and U.S. Patent Application Publication No. 2002/0057057 (“Sorg”). Claims 5, 14, and 15 stand rejected as obvious over Bauer in view of Spaeth and U.S. Patent No. 5,556,809 (“Nakagawa”). These rejections are respectfully traversed.

Bauer discloses in Figure 2, and in the corresponding description in column 5, a package having an optical sensor 22 which is attached to the top side of base substrate 28 and which is surrounded by a seal material 46. A window 48 is bonded to the base substrate 28 in a spaced-apart relationship, the spacing distance determined by the seal material 46. The cavity 52, which is formed and enclosed by the base substrate 28, the seal material 46 and the window 48, may be filled with an optically transparent curable resin.

As acknowledged in the Office Action, Bauer does not describe or suggest the configuration of an optical device, semiconductor component, and connecting layer recited in claim 1.

The Office Action turns to Spaeth for the features of claim 1 missing from Bauer. Spaeth discloses an optoelectronic transducer 11 which has a base plate 1 and spacers 7 thereon. A lens

system 8 is located on and joined to the spacers 7 by adhesive bonding and/or soldering. A solder or adhesive layer 9 is inserted between the spacers 7 and the lens system 8 (see Figure 1 and column 3 lines 1 to 20 and lines 43 to 56).

The Examiner cites adhesive layer 9 as being the connecting layer. However, as discussed in the Request for Reconsideration filed November 4, 2009, Claim 1 recites “a connecting layer made of a radiation-transmissive, deformable material arranged in a gap between the radiation coupling area of the semiconductor component and the optical device.” Adhesive layer 9 in Spaeth is positioned between the spacers 7 and the lens 8, rather than between the semiconductor component 6 and the lens 8. Moreover, adhesive layer 9 is not described as being radiation-transmissive, nor is adhesive layer 9 described as being deformable. Thus, adhesive layer 9 is not the claimed connecting layer.

Thus, Spaeth does not remedy the deficiencies of Bauer discussed above. The combination of Bauer and Spaeth therefore does not describe or suggest the configuration of optical device, semiconductor component, and connecting layer recited in claim 1.

In the Advisory Action, the Examiner maintains that the term “in between” can be construed broadly enough to cover the configuration disclosed in Spaeth. However, the Examiner has not addressed the other point raised by Applicant, which is that claim 1 requires “a connecting layer made of a radiation-transmissive, deformable material.” Adhesive layer 9 does not meet this limitation. Nor does Spaeth even remotely suggest such a configuration. Why would one of ordinary skill in the art use a radiation-transmissive material between the spacers 7 and the lens 8 of Spaeth?

Furthermore, Applicant would like to point out that new claims 18 and 19 both recite “wherein the connecting layer contacts both the radiation coupling area of the semiconductor

component and the optical device.” This feature even more clearly distinguishes the claimed subject matter from the combination of Bauer and Spaeth.

In view of the above, claim 1 is submitted to be patentable over the combination of Bauer and Spaeth. A review of Sorg and Nakagawa (cited against the dependent claims) has failed to reveal anything that would remedy the deficiencies of the combination of Baer and Spaeth with respect to the features of claim 1.

Independent Claim 10 And The Dependent Claims

Independent Claim 10 recites features similar to those of Claim 1 and therefore is also believed to be patentable over the cited references for the reasons discussed above.

The other claims in this application are each dependent from one or another of the independent claims discussed above and are therefore believed patentable for the same reasons. Since each dependent claim is also deemed to define an additional aspect of the invention, however, the individual reconsideration of the patentability of each on its own merits is respectfully requested.

Conclusion

Based on the foregoing remarks, this application is in condition for allowance. Early passage of this case to issue is respectfully requested.

It is believed that no fees or charges are required at this time in connection with the present application. However, if any fees or charges are required at this time, they may be charged to our Patent and Trademark Office Deposit Account No. 03-2412.

Respectfully submitted,

COHEN PONTANI LIEBERMAN & PAVANE LLP

By /Edward M. Weisz/
Edward M. Weisz
Reg. No. 37,257
551 Fifth Avenue, Suite 1210
New York, New York 10176
(212) 687-2770

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